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09/597,780	06/20/2000	Alessandro Cesare Callegari	YOR-9-2000-0010	6159
<div>7590 05/01/2009</div> <div>Paul D. Greeley, Esq. Ohlandt, Greeley, Ruggiero &amp; Perle, L.L.P. One Landmark Square 10th Floor Stamford, CT 06901-2682</div>				
EXAMINER				
NGUYEN, HOAN C				
ART UNIT		PAPER NUMBER		
2871				
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

**Office Action Summary****Application No.**

09/597,780

**Applicant(s)**

CALLEGARI ET AL.

**Examiner**

HOAN C. NGUYEN

**Art Unit**

2871

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 09 February 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 9, 11-13, 37 and 41-45 is/are pending in the application.
- 4a) Of the above claim(s) 45 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 9, 11-13, 37 and 41-44 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/C)
- 4) ☐ Interview Summary (PTO-413)
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_
- Paper No(s)/Mail Date \_\_\_\_\_

## **DETAILED ACTION**

### ***Response to Amendment***

Applicant's arguments with respect to claims 9, 37 and new claim 45 based on the Response filed on 02/09/2009 have been considered but are moot in view of the new ground(s) of rejection. Therefore, this is Final action.

New claim 45 contains the limitation, which is not original elected on 10/27/2003.

### ***Election/Restrictions***

This application contains claims directed to the following patentably distinct species of the claimed invention:

A. The species of First embodiment drawn to alignment method using mechanical mask for ion bombardment (Figs. 9 and 14a). This species using mechanical mask was elected on 10/27/2003.

B. The species of Second embodiment drawn alignment method using photo resist as static mask (figure 14b). This species using photo-resist mask in the amended limitation in claims 1 and 37 was NOT elected.

C. The species of Third embodiment drawn to alignment method using conventional UV radiation (Fig. 7). This species using UV radiation was NOT elected.

D. The species of Fourth embodiment drawn to alignment method using fringe field (figures 8a-b).

Applicant is required under 35 U.S.C. 121 to elect a single disclosed species for prosecution on the merits to which the claims shall be restricted if no generic claim is finally held to be allowable. Currently, there is no generic claim.

Applicant is advised that a reply to this requirement must include an identification of the species that is elected consonant with this requirement, and a listing of all claims and any drawings readable thereon, including any claims subsequently added. An argument that a claim is allowable or that all claims are generic is considered nonresponsive unless accompanied by an election.

Upon the allowance of a generic claim, applicant will be entitled to consideration of claims to additional species which are written in dependent form or otherwise include all the limitations of an allowed generic claim as provided by 37 CFR 1.141. If claims are added after the election, applicant must indicate which are readable upon the elected species. MPEP § 809.02(a).

Should applicant traverse on the ground that the species are not patentably distinct, applicant should submit evidence or identify such evidence now of record showing the species to be obvious variants or clearly admit on the record that this is the case. In either instance, if the examiner finds one of the inventions unpatentable over the prior art, the evidence or admission may be used in a rejection under 35 U.S.C. 103(a) of the other invention.

New claim 45 and the amended claims 1 and 37 are directed to an invention that is independent or distinct from the invention originally claimed for the following reasons:

Claim 45 is the device claim including the feature "the domains of the dry deposited layer by exposed to ultraviolet light", which were not originally presented and elected.

Claim 1 and 37 amended with limitation "photo-resist mask", which were not originally presented and elected. As originally presented, the examiner has considered and examined only the originally presented claims with the device claims in the election on 10/27/2003.

Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claim 45 and limitation "photo-resist mask" of claims 1 and 37 are withdrawn from consideration as being to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 812.03.

Applicant is reminded that upon the cancellation of claims of a non-elected invention; the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be a diligently-filed petition under 37 CFR 1.48 (b) and by the fee required under 37 CFR 1.17(h).

Furthermore, Applicant's election of species A filed on 10/27/2003 was treated as an election without traverse. New claim 45 is withdrawn from consideration. the amended limitation "photo-resist mask" are deleted from claims 1 and 37.

Applicant cancelled claims 1-8, 10, 14-36 and 38-40. Claims 9, 11-13, 37, 40-44 are elected with deleting the amended limitation "photo-resist mask".

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. Claim 9, 11-13 and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Oh et al. (US6665036B2) in view of Kim et al. (US006111627A), Hiroshi (US5995186A), Callegari et al. (US6061114A).

In regard to claims 9 and 37, Oh et al. teach (Fig. 3A-B) a multi-domain liquid crystal display comprising

- a bottom substrate 210 having a first surface;
- a transparent conductive layer (data electrodes 208 and common electrode 209, thin film transistors and other display circuitry in bottom substrate to form the in-plane switching mode) disposed over said first surface of said bottom substrate.
- a top substrate 211 having a second surface;
- a color filter layer (color filter 229) disposed over a surface of the top substrate;
- a transparent conductive layer 118 disposed over said color filter;
- a first alignment layer 223a over said first transparent conductive layer

- a second alignment layer 223b made of over said second surface; said second alignment layer being spaced adjacent to and facing said first alignment layer;
- a liquid crystal material 230 disposed in the space therebetween;

wherein

However, Oh et al. fail to disclose

- (a) a second transparent conductive layer disposed over the color filter;
- (b) a plurality of uniformly sized spacer 108 distributing within said space;
- (c) the alignment layers made of the dry deposited layers, which are made of material selected from the group consisting of hydrogenated diamond-like carbon, amorphous hydrogenated silicon, silicon carbide (SiC), silicon dioxide (SiO<sub>2</sub>), glass, silicon nitride (Si<sub>3</sub>N<sub>4</sub>), alumina (Al<sub>2</sub>O<sub>3</sub>), cerium(IV) oxide (CeO<sub>2</sub>), tin oxide (SnO<sub>2</sub>), zinc titanate (ZnTiO<sub>2</sub>) and a combination thereof as claim 12 cited;
- (d) each of said first alignment layer and said second alignment layer made of the dry deposited layers is divided into a plurality of pixels each having a boundary and at least two domains; wherein said domains are aligned by a mechanical mask; said dry deposited layers are exposed to at least a first ion beam bombardment and a second ion beam bombardment, where a ion beam and a ion beam use the same ion, which is selected from the group consisting argon, nitrogen, oxygen and a mixture thereof; and a direction of said first ion beam bombardment with respect to said dry deposited layer is different than a direction of said second ion beam bombardment with respect to said dry deposited layer.

Kim et al. teach (Fig.4) (a) a second transparent conductive layer disposed over the color filter, which is formed on the surface of upper substrate; this second transparent conductive layer used for preventing electrostatics forming on the upper substrate (col. 3 lines 1-3). Kim also discloses the alignment layers 44 and 28.

Hiroshi teaches (Fig. 5) (b) a plurality of uniformly sized spacer 108 distributing within said space for supporting the thickness of liquid crystal layer (col. 5 lines 25-29).

Callegari et al. teach

(c) the alignment layers made of the dry deposited layers, which are made of material selected from the group consisting of hydrogenated diamond-like carbon, amorphous hydrogenated silicon, silicon carbide (SiC), silicon dioxide (SiO<sub>2</sub>), glass, silicon nitride (Si<sub>3</sub>N<sub>4</sub>), alumina (Al<sub>2</sub>O<sub>3</sub>), cerium(IV) oxide (CeO<sub>2</sub>), tin oxide (SnO<sub>2</sub>), zinc titanate (ZnTiO<sub>2</sub>) and a combination thereof for requiring fewer steps and less cost to manufacture (col. 3 lines 51-58);

(d) each of said first alignment layer and said second alignment layer made of the dry deposited layers is divided into a plurality of pixels each having a boundary and at least two domains; wherein each of said multi-domain, dry deposited layers is obtained by a mechanical mask 966; said dry deposited layers are exposed to at least a first particle (ion) beam and a second particle (ion) beam, where ion beam bombardment and a second ion beam bombardment use the same ion, which is selected from the group consisting argon, nitrogen, oxygen and a mixture thereof; and a direction of said first ion beam bombardment with respect to said dry deposited layer is different than a direction of said second ion beam bombardment with respect to said dry



deposited layer with the features of claim 11; thus deposited layers (alignment layers) are exposed to at least a first particle treatment and a second particle treatment to selectively align said domains in first direction (first fashion) and second direction (second fashion) respectively for resulting multidomain device so that attributing large view angle (col. 6 lines 19-31). **Callegari et al. also disclose mask with features etched into it can also be used to selectively align a local area, thus leading to the fabrication of domains of alignment** (col. 6 lines 24-27).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to further modify a multi-domain liquid crystal display as Oh et al. disclosed with (a) a second transparent conductive layer disposed over the color filter, which is formed on the surface of upper substrate; this second transparent conductive layer used for preventing electrostatics forming on the upper substrate (col. 3 lines 1-3) as taught by Kim et al.; (b) a plurality of uniformly sized spacer 108 distributing within said space for supporting the thickness of liquid crystal layer (col. 5 lines 25-29) as taught by Hiroshi; (c) the alignment layers made of the dry deposited layers, which are made of material selected from the group consisting of hydrogenated diamond-like carbon, amorphous hydrogenated silicon, silicon carbide (SiC), silicon dioxide (SiO<sub>2</sub>), glass, silicon nitride (Si<sub>3</sub>N<sub>4</sub>), alumina (Al<sub>2</sub>O<sub>3</sub>), cerium(IV) oxide (CeO<sub>2</sub>), tin oxide (SnO<sub>2</sub>), zinc titanate (ZnTiO<sub>2</sub>) and a combination thereof for requiring fewer steps and less cost to manufacture (col. 3 lines 51-58); (d) each of said first alignment layer and said second alignment layer made of the dry deposited layers is divided into a plurality of pixels each having a boundary and at least two domains; wherein each of

said multi-domain, dry deposited layers is obtained by a mechanical mask 966; said dry deposited layers are exposed to at least a first particle (ion) beam and a second particle (ion) beam, where a first ion beam bombardment and a second ion beam bombardment use the same ion, which is selected from the group consisting argon, nitrogen, oxygen and a mixture thereof; and a direction of said first particle beam treatment with respect to said dry deposited layer is different than a direction of said second particle treatment beam for resulting multidomain device so that attributing large view angle (col. 6 lines 19-31) with (1) non-contact alignment, (2) low energy, (3) large area uniform and parallel beam, (4) atomic beam being used to align both surfaces (col. 3 lines 25-40).

2. Claims 40-44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Oh et al. (US6665036B2) in view of Kim et al. (US006111627A), Hiroshi (US5995186A), and Callegari et al. (US6061114A) as applied to claims 9, 11-13, 37 and 40 in further view of Chaudhari et al. (US6124914A).

Oh et al. (US6665036B2) fail to disclose said first ion beam bombardment aligns first and second ones of the domains of at least one of said pixels in a first direction, and wherein said second ion beam bombardment aligns said first domain in a second direction as cited in claims 40-44.

Chaudhari et al. disclose the ion beam bombardment overwrites said first direction of said first domain with said second direction (col. 5 lines 2-26 and 58-63), wherein the first ion beam bombardment aligns first and second ones of the domains of

at least one of said pixels in a first direction, and second ion beam bombardment aligns said first domain in a second direction; with mechanical mask, Fig. 9A-B shows the first ion beam bombardment aligns the alignment layer in one direction of surface 84 and the second ion beam bombardment aligns said first domain in a second direction of surface 82 for patterning alignment direction on an alignment surface from more than one direction.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to further modify a multi-domain liquid crystal display as Oh et al. disclosed with the ion beam bombardment overwrites said first direction of said first domain with said second direction (col. 5 lines 2-26 and 58-63), wherein the first ion beam bombardment aligns first and second ones of the domains of at least one of said pixels in a first direction, and second ion beam bombardment aligns said first domain in a second direction; with mechanical mask, Fig. 9A-B shows the first ion beam bombardment aligns the alignment layer in one direction of surface 84 and the second ion beam bombardment aligns said first domain in a second direction of surface 82 for patterning alignment direction on an alignment surface from more than one direction (col. 3 lines 12-15) as Chaudhari et al. taught.

***Response to Arguments***

Applicant's arguments filed on 09/11/2008 have been fully considered but they are not persuasive.

Applicant's ONLY arguments are follows:

- A. Calligari lacks domains of the dry deposited layers that are aligned by a mechanical mask method. Callegari's mask 966 covers the surrounding substrate and has nothing to do with first and second ion beam bombardments that "selectively align said domains in first and second directions".
- B. Calligari does not teach that "a direction of said first ion beam bombardment with respect to said dry deposited layers is different than a direction of said second ion beam bombardment with respect to said dry deposited layers", as recited in amended claims 9 and 37.

Examiner's responses to Applicants' ONLY arguments are follows:

- A. Callegari et al. disclose mask with features etched into it can also be used to selectively align a local area, thus leading to the fabrication of domains of alignment (col. 6 lines 24-27). Therefore, mask should have domains related to etched features. Callegari et al. disclose that for multidirectional alignment, it is preferred that the multidirections are selected in such a fashion that results in a multidomain device (col. 6 lines 29-31). The multi-directional ion beam bombardment for alignment in the multidirections, which are the alignment in more than one direction (multidirections, e.g.

two directions). Therefore, **the alignment in the multidirections can interpret as “selectively align said domains in multi directions, which include two directions: first and second directions”.**

Furthermore, Callegari et al. also disclose (col. 6 lines 46-47): “Atomic beam-device 948 may further include a mask 966 covering the surrounding of the substrate 920”, which may interpret as “a mask 966 covering substrate surface to generate domains and covering further the surrounding of the substrate. Applicants have **incorrectly** interpreted as “Callegari’s mask 966 covering ONLY the surrounding substrate”.

B. Callegari et al. disclose (col. 6 lines 19-25) “atomic beam 948 can be used to radiate ions at the alignment film to disturb (i.e., to break bonds) and align the atomic structure of the alignment film in a desired direction or orientation, such as in a horizontal, unidirectional or multidirectional manner. A mask with features etched into it can also be used to selectively align a local area, thus leading to the fabrication of domains of alignment”. That may be interpreted as following: “radiate ions of atomic beam 948 align the atomic structure of the alignment film in a desired direction such as multidirectional manner, which must include first ion beam bombardment in one direction and second ion beam bombardment in another direction (multidirectional manner). Furthermore, first ion beam bombardment and second ion beam bombardment can be radiated with different directions (multidirectional manner) at different times.

***Conclusion***

3. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to HOAN C. NGUYEN whose telephone number is (571)272-2296. The examiner can normally be reached on MONDAY-THURSDAY:8:00AM-4:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Nelms can be reached on (571) 272-1787. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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